EMERGENCY ACTION PLAN

POWELL RESERVOIR DAM

Montana Correctional Enterprises Ranch
Bill Dabney, Ranch Director
350 Conley Lake Road
Deer Lodge, Montana 59722

June 1, 2001
May 23, 2003
May 31, 3004
October 4, 2006
July 12, 2007
October 7, 2008
October 26, 2009
___December1,2010_____

If Powell Reservoir is failing or failure seems imminent, call:

Powell County Sheriff ..... 911 or 846-2711

Disaster and Emergency Services - Bernard K. Barton..... Office: 846-3680
Cell: 560-1080
Home: 846-2744

Bill Dabney, Montana Correctional Enterprises Ranch .....Office: 846-1320 Ext 2322
Home: 846-3243
Cell: 560-1337

Montana Disaster and Emergency Service - Helena..... 841-3911

CONTENTS

I. Introduction 1

II. Notification Procedure

A. Failure is imminent or has occurred 3

1. Flowchart 4

2. What the dam owner should do 5

B. Potentially hazardous situation is developing 5

1. Flowchart 6

2. What the dam owner should do 7

C. Posting of the Notification Flowchart and Distribution of EAP 7

D. Telephone Directory 8

III. Mitigation Activities 9

A. Potential Problems and Immediate Response Actions 9

B. Emergency Supplies and Resources 11

IV. APPENDICES

Dam Incident Report Form A-1

Dam Structures B-1

Inundation and evacuation maps C-1

Distribution of EAP D-1

Emergency Equipment Available at MSP/MCE in the event of Dam Breach E-1

I. INTRODUCTION

1. Purpose.
The purpose of this emergency action plan (EAP) is primarily to safeguard the lives and secondarily to reduce property damage of the citizens of Powell County, driving across and living along Powell Creek in the event of flooding caused by a failure of Powell Reservoir.

2. Description of Dam.
Powell Reservoir is in Powell County, SW ¼ of Section 16, Township 7, Range 10W and located on Powell Creek, tributary to Clark Fork River. It is owned by Montana State Prison Ranch, 350 Conley Lake Road, Deer Lodge, Montana 59722, and is used for irrigation and stock watering. Technical data pertaining to Powell Reservoir is listed in the Appendix B.

3. Access to Dam.
Powell Reservoir is located about 3 miles southwest of Montana State Prison. The reservoir is just south of the Powell Creek Road which takes off from the Prison Ranch Road that joins the prison area to the Prison Ranch 2 area. For security purposes, access to the Prison Ranch Road is generally restricted but access and **escorting would be provided in an emergency situation**. Essential personnel would have radio communication.

4. Hazard Area.
The evacuation area extends along Powell Creek to a point where it crosses Interstate Highway 90, about 2 miles south of Deer Lodge, as shown in the Appendix. Hazards include the possible inundation of one dwelling, the Prison Ranch Road and Interstate Highway 90. Inundation and evacuation maps are in the Appendix C.

5. Responsibility and Authority.
Pursuant to the Dam Safety Act, Chapter 15 of Title 85, the dam owner is responsible for production, coordination, maintenance, and implementation of this emergency action plan. Extent of owner implementation is defined through coordination of this plan with the county sheriff and disaster and emergency services coordinator.

6. Periodic Review/Updating.
The owner will review/update this EAP annually. Review/update by a professional engineer will be accomplished as required by dam's operation permit, but no less than every five years.

7. Approval.

By my signature, I acknowledge that I, or my representative, have reviewed this plan, and agree with the tasks and responsibilities assigned herein for my department and/or agency.

Scott F. Hawes 12-2-10

Signature Date

Powell County Sheriff

Bernard K. Barton 12-3-10.

Signature Date

Disaster and Emergency Services

Bernard K. Barton

12-4-10

Signature Date

Dam Owner

Montana Correctional Enterprises Ranch

Bill Dabney, Ranch Director

II. NOTIFICATION PROCEDURES

A. Failure is Imminent or Has Occurred

If Powell Reservoir Dam is failing, three things must be undertaken immediately:

(1) the dwelling downstream from the dam must be evacuated, (2) the Prison Ranch Road and the Interstate Highway crossing by Powell Creek should be manned by appropriate personnel to safeguard traffic, and (3) any steps that might save the dam or reduce damage to the dam should be taken. (Refer to the map in the Appendix C to determine the areas that are likely to be inundated if the dam fails). The evacuation will be handled according to the county warning plan.

2. What the Dam Owner Should Do

As dam owner, it is our responsibility to:

a. Call the Sheriff's Dispatch Center (911) and Disaster and Emergency Services (Bernard K. Barton, Office 846-3680). Be sure to say, "This is an emergency". They will call other authorities as needed and the media and begin the evacuation.

b. Do whatever is necessary to bring anyone in immediate danger (someone on the dam, or directly below the dam, or evacuees if directed by the sheriff) to safety.

c. Monitor the danger and prevent traffic from traveling across the floodwater on the Prison Road and on Pioneer Road.

d. Keep in frequent touch with Disaster and Emergency Services. They will tell you how to handle the emergency.

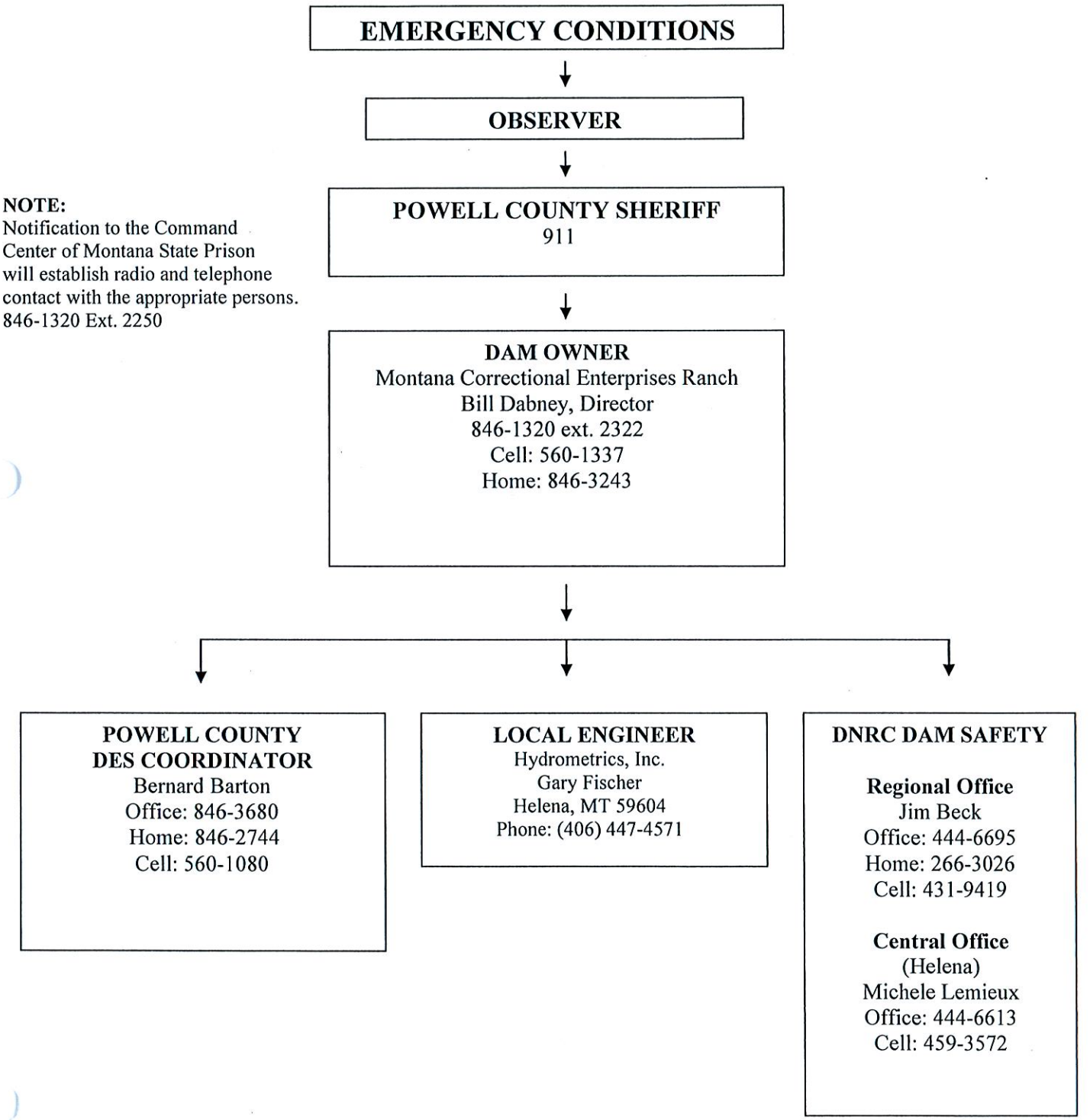
e. If all means of communication are lost: (1) try to find out why, (2) try to get to another radio or telephone that works (the Prison radio system is always manned and operational), or (3) get someone else to try to reestablish communications. If these means fail, handle the immediate problems as well as we can, and periodically try to reestablish contact with Disaster and Emergency Services.

f. It is important to accurately judge whether the dam is about to fail. If we aren't sure whether the dam is threatened, we will seek advice from a qualified engineer or call the Department of Natural Resources and Conservation Dam Safety Section.

B. Potentially Hazardous Situation is Developing

A potentially hazardous situation is an event or condition not normally encountered in the routine operation of the dam and reservoir. Among the unusual occurrences that may affect the dam are dam embankment problems, failure of the spillway or outlet works, heavy precipitation or rapid spring snowmelt, landslides, earthquakes, erosion, theft, vandalism, acts of sabotage, and serious accidents. These occurrences may endanger the dam, the public, or the downstream valley and may necessitate a temporary or permanent revision of the dam's operating procedures.

FIGURE 1
POWELL RESERVOIR DAM
POTENTIALLY HAZARDOUS SITUATION
"NOTIFICATION FLOW CHART"



NOTE:
Notification to the Command Center of Montana State Prison will establish radio and telephone contact with the appropriate persons. 846-1320 Ext. 2250

2. What the Dam Owner Should Do

If we discover an unusual condition of the dam embankment that could threaten the structure:

a. Have a qualified engineer inspect the dam as soon as possible to determine whether emergency action is necessary.

b. Notify the county Disaster and Emergency Services Coordinator of the potential problem.

c. Contact the Department of Natural Resources and Conservation (DNRC) Dam Safety Section.

3. Among the conditions we would watch for are: overtopping of the dam by flood waters; loss of material from the dam crest due to storm wave erosion; slides on either the upstream or downstream slope of the embankment as evidenced by sloughing, cracking, bulging, or scarping of the embankment; erosional flows through, beneath, or around the embankment as evidenced by excessive seepage, discoloration of the seepage, boils on the downstream side, sinkholes; failure of spillway due to clogging or erosion; or movement of the dam on its foundation as evidenced by misalignment, settlement, or cracking.

4. When calling either an engineer or the DNRC to report a problem, we would use the form in Appendix A to ensure we can provide sufficient information for the engineer to analyze the problems. In addition, we would prepare a sketch showing the extent of the problem and revise the sketch periodically if the problem develops further. Section III includes further guidelines for courses of action to take to mitigate the effect of many problems.

C. The Notification Flowchart and Distribution of EAP

The notification flowchart has been circulated to all appropriate Prison Ranch and Prison personnel. The Powell County Sheriff's Office and the Powell County DES Coordinator have copies of the plan. A Plan Distribution List is found in Appendix D.

TELEPHONE DIRECTORY

PRIORITY ONE

1. SHERIFF

Powell County	911 or 846-2711

2. DISASTER AND EMERGENCY SERVICES

Powell County	846-3680
Bernard K. Barton	Home: 846-2744 Cell: 560-1080
Montana Disaster and Emergency Services Division (Helena)	841-3911

3. EVACUEES

Reistad, Melvin E., 291 Greenhouse Road	846-1377

PRIORITY TWO

4. LOCAL ENGINEERS

Gary Fischer	447-4571

5. MONTANA DEPT. OF NATURAL RESOURCES AND CONSERVATION (DNRC)

Jim Beck, Regional Engineer,	Home: 266-3026 Office: 444-6695 Cell: 431-9419
Michelle Lemieux, Dam Safety Program Manager	Office: 444-6613 Cell: 459-3572
Laurence Siroky, State Water Projects Bureau Chief	Office: 444-6816 Cell: 431-7475 Home: 442-2806

6. NATIONAL WEATHER SERVICE

Missoula	329-4718
Great Falls	453-9642

III. MITIGATION ACTIONS

Besides normal monitoring of the dam's condition which is done at least monthly and more often when the storage level is high, the owner will provide continuous monitoring and inspection during and after extreme events such as storms and earthquakes. The magnitude of an earthquake or storm can be obtained from DNRC Dam Safety. Actions suggested to mitigate problems that develop should never be continued at the risk of injury or at the expense of lessening efforts related to evacuation. Monitoring should identify any of the following potential problems.

A. Potential Problems and Possible Immediate Response Actions

1. OVERTOPPING BY FLOOD WATERS

   a. Open outlet to its maximum safe capacity.

   b. Place sandbags along the crest to increase freeboard and force more water through the spillway and outlet.

   c. Provide erosion-resistant protection to the downstream slope by placing plastic sheets or other materials over eroding areas.

   d. Divert flood waters around the reservoir basin if possible.

   e. Create additional spillway capacity by making a controlled breach in a low embankment or dike section where the foundation materials are erosion resistant.

2. LOSS OF FREEBOARD OR DAM CROSS SECTION DUE TO STORM WAVE EROSION

   a. Place additional riprap or sandbags in damaged areas to prevent further embankment erosion.

   b. Lower the water level to an elevation below the damaged area.

3. SLIDES IN THE UPSTREAM OR DOWNSTREAM SLOPE OF THE EMBANKMENT

   a. Lower the water level at a rate and to an elevation considered safe given the slope condition. If the outlet is damaged or blocked, pumping, siphoning, or a controlled breach may be required.

   b. Stabilize slides on the downstream slope by weighting the tow area with additional soil, rock, or gravel and then restore lost freeboard by placing sandbags at crest.

4. EROSIONAL FLOWS THROUGH THE EMBANKMENT

   a. Plug the flow with whatever material is available (hay bales, bentonite, or plastic sheeting if the entrance to the leak is in the reservoir basin).

   b. Lower the water level until the flow decreases to a non-erosive velocity or until it stops.

   c. Place a protective sand and gravel filter or boil ring over the exit area to hold materials in place.

5. FAILURE OF APPURTENANT STRUCTURES SUCH AS OUTLETS OR SPILLWAYS

   a. Implement temporary measures to protect the damaged structure, such as closing an outlet or providing temporary protection for a damaged spillway.

   b. Lower the water level to a safe elevation. If the outlet is inoperable, pumping, siphoning, or a controlled breach may be required.

6. MASS MOVEMENT OF THE DAM ON ITS FOUNDATION, (SPREADING OR MASS SLIDING FAILURE)

   a. Immediately lower the water level until excessive movement stops.

7. EXCESSIVE SEEPAGE AND HIGH LEVEL SATURATION OF THE EMBANKMENT

   a. Lower the water to a safe level.

   b. Continue frequent monitoring for signs of slides, cracking or concentrated seepage.

8. SPILLWAY BACK CUTTING THREATENING RESERVOIR EVACUATION

   a. Reduce the flow over the spillway by fully opening the main outlet.

   b. Provide temporary protection at the point of erosion by placing sandbags, riprap materials, or plastic sheets weighted with sandbags.

   c. When the inflow subsides, lower the water to a safe level.

9. EXCESSIVE SETTLEMENT OF THE EMBANKMENT

a. Lower the water level by releasing it through the outlet or by pumping, siphoning, or a controlled breach.

b. If necessary, restore freeboard, preferably by placing sandbags.

B. Emergency Supplies and Resources

In the vicinity of Powell Reservoir Dam are soils suitable for emergency repairs. The hillside both north and south are composed of clayey, silty soils that should be fairly impermeable. One mile below the reservoir there is a large stockpile of large rocks.

Heavy equipment will be available at the Prison and Ranch compounds. The Emergency Equipment List is found in Appendix E.

APPENDIX A
DAM INCIDENT REPORT FORM

DATE_____ TIME_____

NAME OF DAM_____

STREAM NAME_____

LOCATION_____

COUNTY_____

OBSERVER_____

OBSERVER TELEPHONE_____

NATURE OF PROBLEM_____

LOCATION OF PROBLEM AREA_____
(Looking Downstream)

_____

XTENT OF PROBLEM AREA_____

_____

FLOW QUANTITY AND COLOR_____

WATER LEVEL IN RESERVOIR_____

WAS SITUATION WORSENING_____

EMERGENCY STATUS_____

CURRENT WEATHER CONDITIONS_____

ADDITIONAL COMMENTS:_____

_____

_____

APPENDIX B

Technical Data for Powell Reservoir

Maximum Reservoir Capacity to the Crest of the Dam		250 acre/ft
Normal Reservoir Capacity Measured to the Emergency Spillway Crest		200 acre/ft
Normal Water Depth of Measured from Streambed to the Crest of the Emergency Spillway		47.7 ft
Dam Height Measured from the Streambed to the Crest of the Dam		52 ft
Dam Crest Width		16 - 40 ft
Length of Dam		1200 ft
Outlet Capacity	8" Drisco Pipe inside of	12" steel pipe
Spillway	Trapezoidal vegetated earth ground, 200 ft long,	175 ft wide
Date Constructed		1981
ajor Rehabilitation	Completed	1995

1. Slip line outlet pipe
2. Blanket/filter drain
3. Downstream support embankment

APPENDIX D

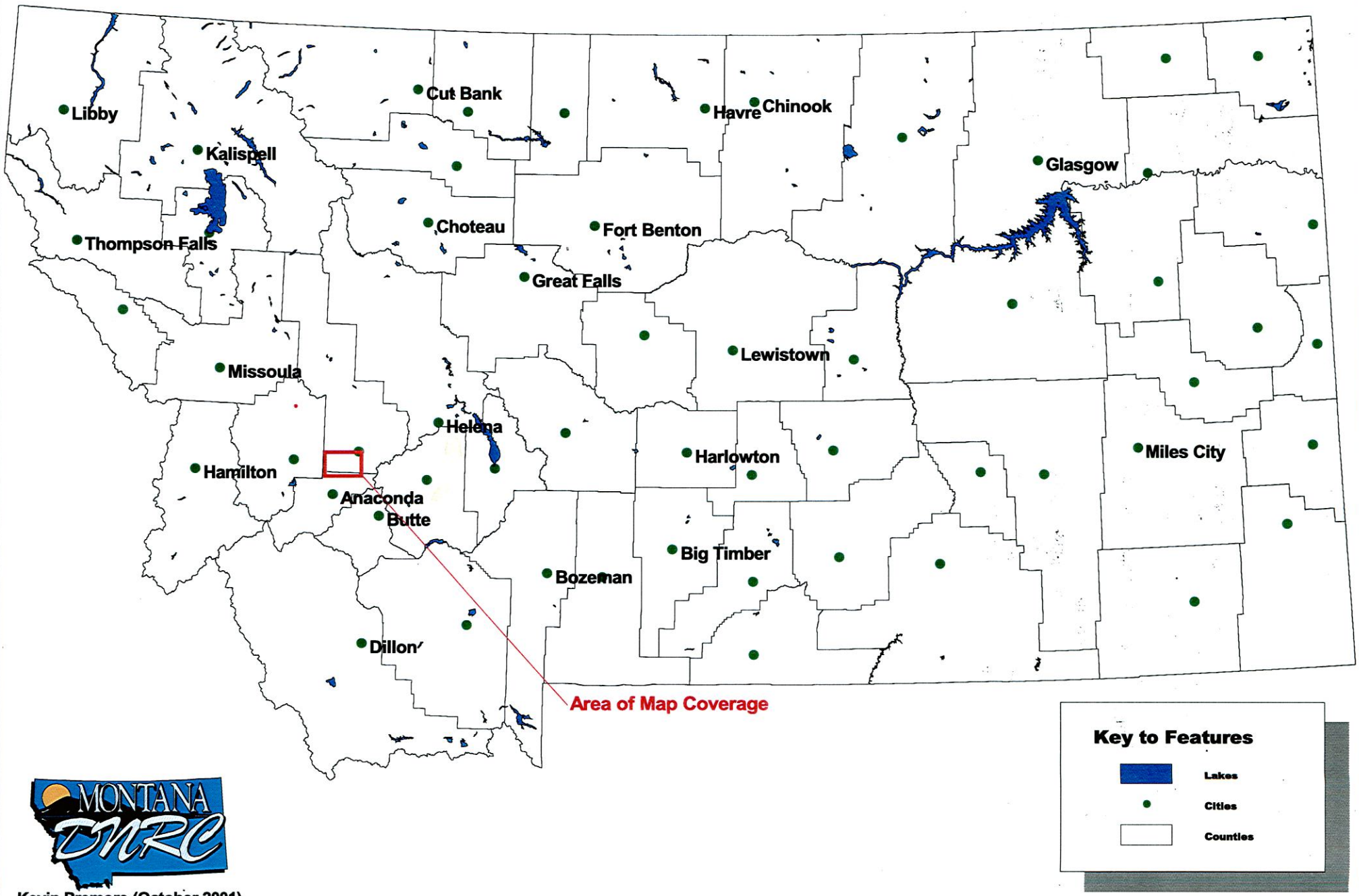
Dam Owner/Operator	2
County Sheriff	1
County DES	1
DNRC Dam Safety	1
Command Post	1
Carl Nelson	1

APPENDIX E

EMERGENCY EQUIPMENT AVAILABLE AT MSP/MCE IN THE EVENT OF DAM BREACH

OWNER	VEH#	DESCRIPTION
MCE	D-4E	CATERPILLAR CRAWLER
MCE	JD-850	JOHN DEERE 850 CRAWLER
MCE	JD-544	JOHN DEERE FRONT END LOADER
MSP	IP-5	CLARK FRONT END LOADER
MSP	GR-4	GALLION GRADER
MSP	GR-5	GALLION GRADER
MCE	GR-570	JOHN DEERE 570- A GRADER
MSP	M-85	MELROE BOBCAT SKIDSTEER LOADER
MSP	M-844	NEW HOLLAND SKIDSTEER LOADER
MSP	JCB-214	JCB-214 BACKHOE
MSP	JD-410	JOHN DEERE 410-B BACKHOE
MCE	T-65	CASE 580-C BACKHOE
MSP	CR-1	LORRAINE CRANE
MCE	MSP-291	CHEVY DUMP TRUCK
MCE	MSP-284	IHC 1850 DUMP TRUCK
MCE	MSP-223	IHC 1700 DUMP TRUCK
MSP	M-6630	GMC DUMP TRUCK
MSP	MSP-345	IHC CARGOSTAR DUMP TRUCK
MSP	MSP-346	IHC CARGOSTAR DUMP TRUCK
MSP	MSP-321	IHC LOADSTAR 1700 DUMP TRUCK
MSP	MSP-303	FORD F-700 DUMP TRUCK
MCE	MSP-298	PETERBILT TRUCK TRACTOR
MCE	MSP-256	GMC D7000 TRUCK TRACTOR
MCE	MSP-294	LOWBOY TRAILER
MCE	MSP-277	DROP DECK TRAILER
MSP	MSP-212	LOWBOY TRAILER
MSP		SELF PROPELLED VIBRATORY ROLLER/PACKER
MSP		2 HAND HELD GAS POWERED COMPACTORS
MSP	M-761	SELF PROPELLED ROLLER 6’

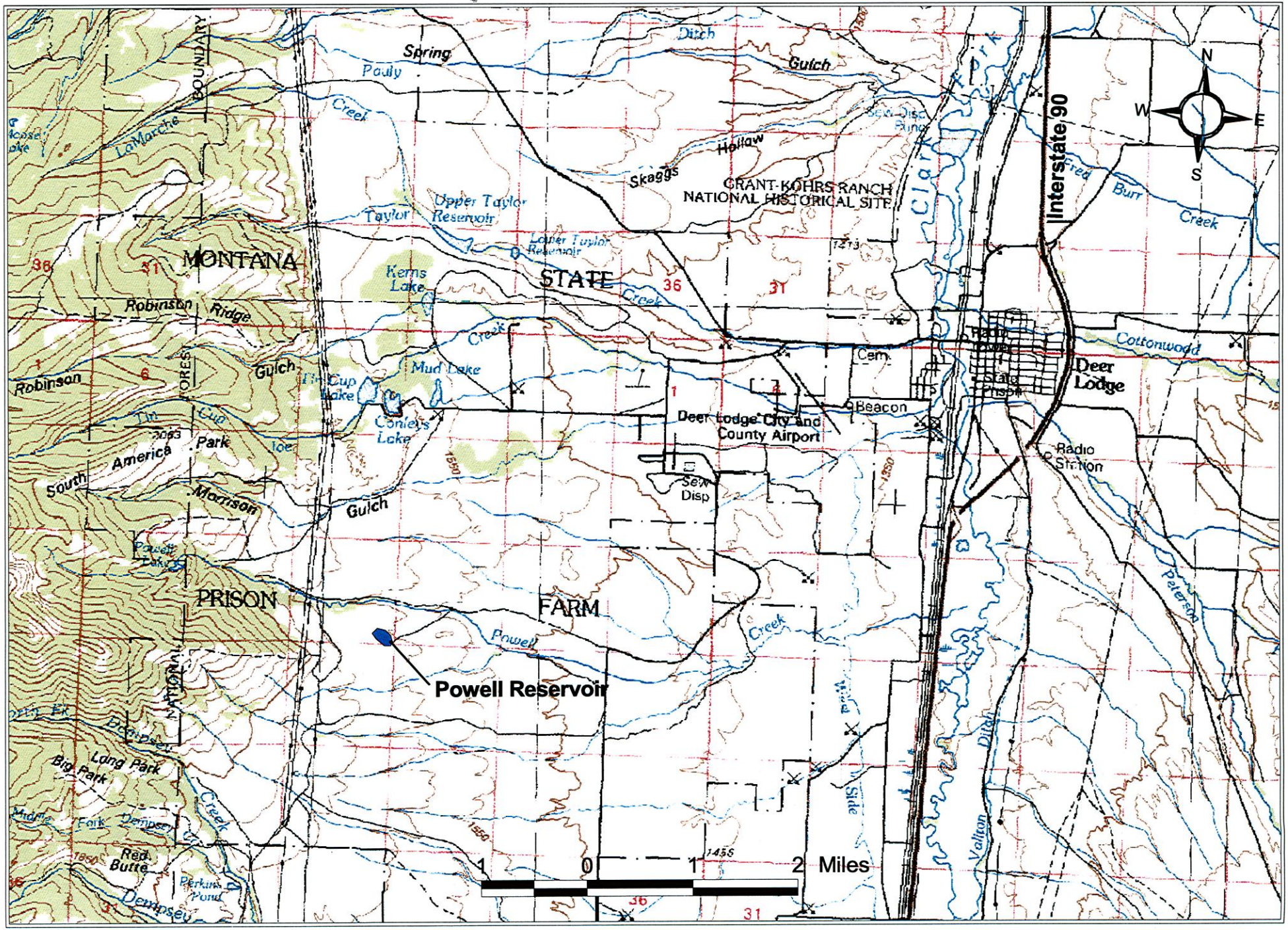
Powell Dam Overview Map



MONTANA DNRC

Kevin Premore (October 2001)

Powell Dam Inset Map



Powell Dam
Inundation Photos

Inundation Areas are merely an estimate.
Actual flood area may vary with conditions.
Be sure to evacuate beyond suspected flood area.

Key

Inundation Area

Approximate Scale: Photo = 1 mile

Kevin Premore - October 2001

Powell Dam
Inundation Photos

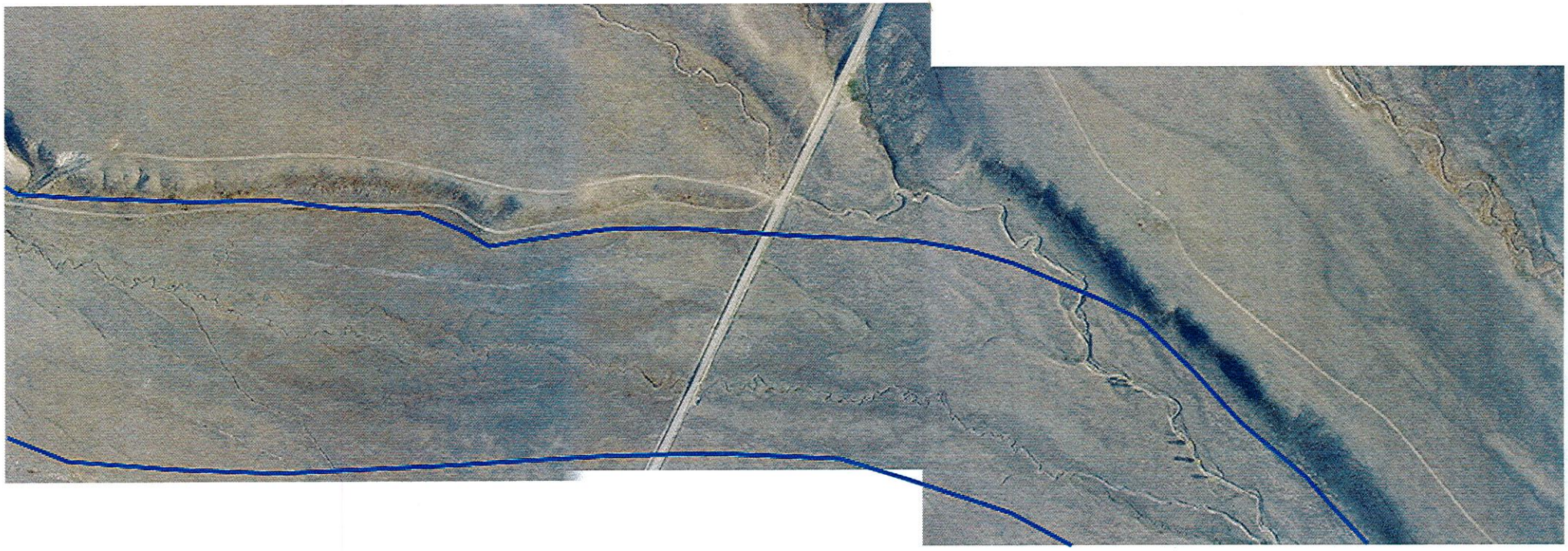
Inundation Areas are merely an estimate.
Actual flood area may vary with conditions.
Be sure to evacuate beyond suspected flood area.

Key

Inundation Area

Approximate Scale: Photo = 1 mile

Powell Dam
Inundation Photos



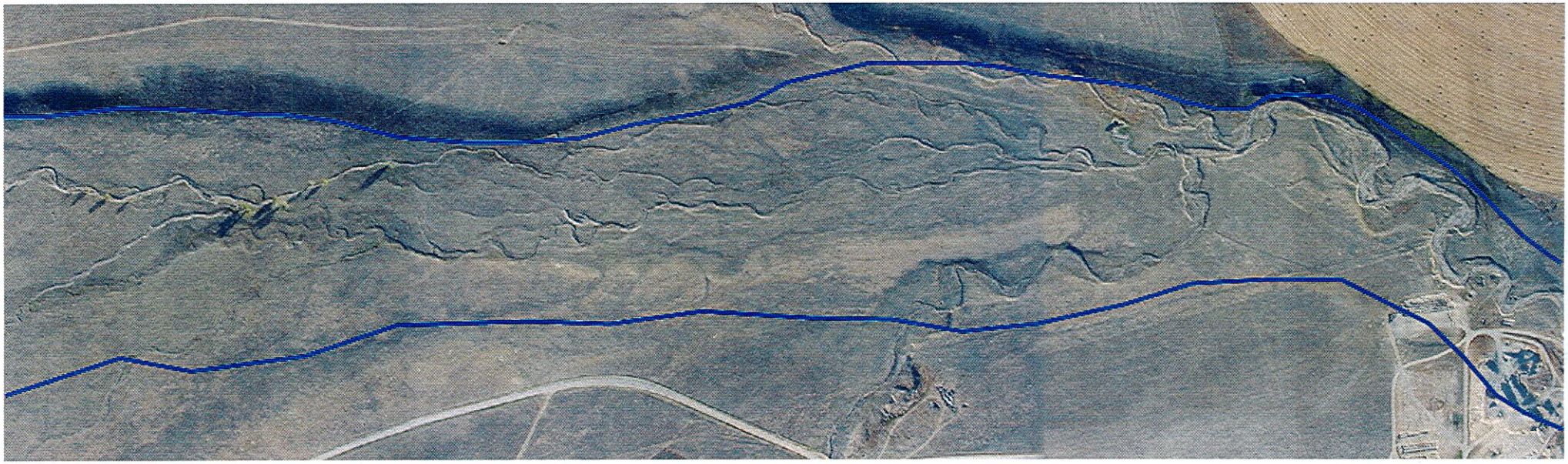
Inundation Areas are merely an estimate.
Actual flood area may vary with conditions.
Be sure to evacuate beyond suspected flood area.

Key

Inundation Area

Approximate Scale: Photo = 1 mile

Powell Dam
Inundation Photos



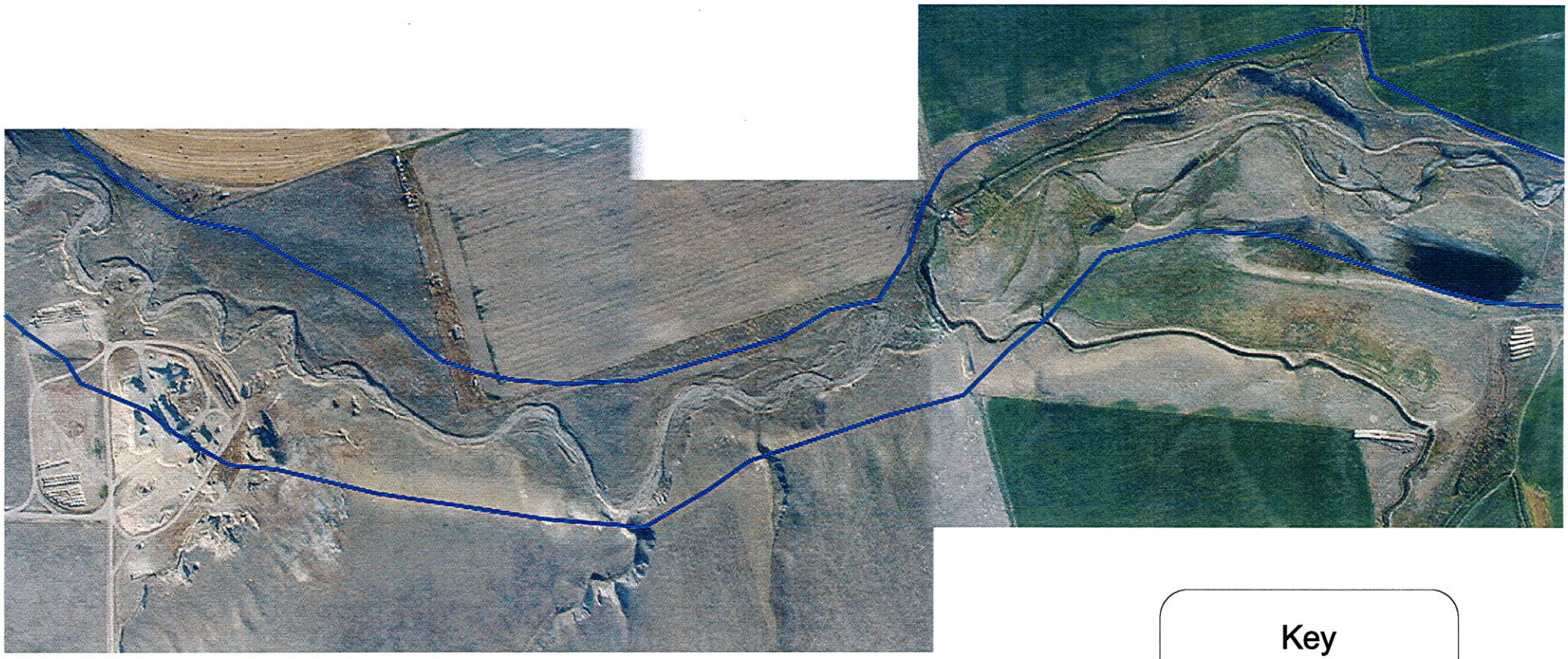
Inundation Areas are merely an estimate.
Actual flood area may vary with conditions.
Be sure to evacuate beyond suspected flood area.

Key

Inundation Area

Approximate Scale: Photo = 1 mile

Powell Dam
Inundation Photos



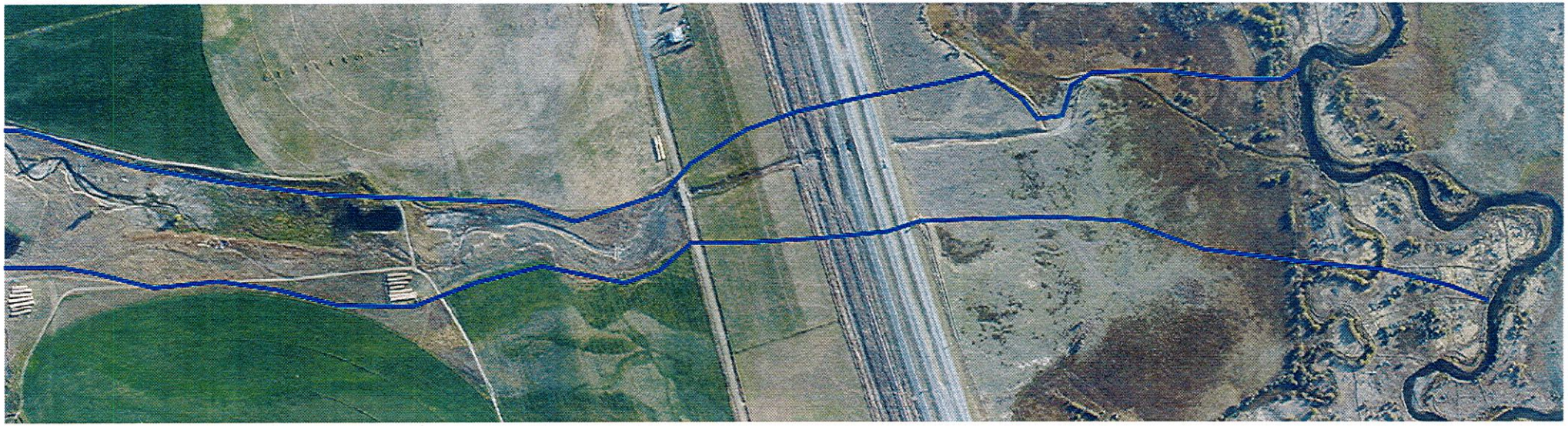
Key

Inundation Area

Inundation Areas are merely an estimate.
Actual flood area may vary with conditions.
Be sure to evacuate beyond suspected flood area.

Approximate Scale: Photo = 1 mile

Powell Dam
Inundation Photos



Inundation Areas are merely an estimate.
Actual flood area may vary with conditions.
Be sure to evacuate beyond suspected flood area.

Key

Inundation Area

Approximate Scale: Photo = 1 mile